Canadian Journey to a national Electronic Health Record

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Purpose of document	Report detailing canada's journey towards its national HER
Other detail (delete row if appropriate)	

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Keywords	Electronic health records; EHRs; infoway; Blueprint; Canada; Infostructure;

Canadian Journey to a national Electronic Health Record

2001 – Establishment of *infoway*

Infoway is a not-for-profit organisation set up to foster and accelerate the development, and the adoption of electronic health information systems. Infoway has utilised existing information systems, driving for compatible standards and communications technologies to be adopted nationwide. Infoway has strategically directed the implementation of the EHR in Canada in collaboration with provinces and territories. The organisation is governed by Canada's 14 federal, provincial and territorial Deputy Ministers of Health. (Infoway 2013; 2015).

Canada has chosen to utilise hub-and-spoke repositories over point-to-point information exchange systems. Estonia's system is a decentralised point-to-point information exchange system, where each provider maintains its own database and shares elements of information as requested. The hub-and-spoke repository systems collect and store copies of critical health information in jurisdictionally coordinated repositories, enabling the care giver to view and access consolidated, timely information easy via a computer. Similar approaches are used by Vista, Epic (Kaiser Permanente) and in UK. (Infoway 2015)

The nationwide approach to EHR aims to ensure that consistent standards are used in building EHR elements, thus enabling future interoperability within and across jurisdictions. A shared approach also guarantees that movement of knowledge and people across jurisdiction is simple, that platform quality nationwide is equal, and that cooperation between different parts of the system is possible in terms of systems design and vendor negotiations. All this will reduce long-term costs and implementation time by leveraging care and cross-jurisdictional knowledge. (Infoway 2015)

The most unique element of the Canada's approach is the strategic investor role of *Infoway* adopted to administer the allocation of the federal investment funds. It also uses a collaborative, jointly funded, and shared governance model with members including the deputy ministers of health from across the country. (Infoway 2015)

2002 – Blueprint, starting point for a shared Infostructure

In 2002 Blueprint v. 1 was created as the conceptual model for pan-Canadian interoperability to complement the investment programs of Infoway.

Infoway (2009) explains:

> *The Blueprint is an enterprise systems architecture that uses the well accepted principles of a Services Oriented Architecture to enable the applications at the many points of service to use one standards-based set of interfaces to exchange information through a shared EHR Infostructure (EHRi). Each jurisdiction in Canada will operate one or more instances of this standardized infostructure.*
>
> *The Blueprint describes how each point of service application can connect to the shared infostructure using a common set of interface standards, rather than connecting to each other directly. These interfaces are handled by the Health Information Access Layer (HIAL) which provides common services to support, for example, authorization and authentication of users and logging and auditing of all accesses. Point of service applications send distinct information about clients/patients to a set of shared information repositories that are managed by the Longitudinal Record Services. The applications (or an integrated viewer) can then request EHR information from the Infostructure using the same mechanisms, securely accessing relevant EHR information captured by many different health disciplines, in many different care settings, and potentially in many jurisdictions across Canada. Each infostructure can communicate with other infostructures, collaborating to deliver clinically relevant information where and when it is needed, regardless of where it was originally captured.*

EHRS Blueprint was the starting point for a nationwide “infostructure” – a shared foundation of hardware, software and communications technologies with associated architectures and working principles that enable an uninterrupted flow of information. The Blueprint created a common vision and important definitions for the main solution components, allowing jurisdictions and Infoway to work together to align EHR initiatives with a common, pan-Canadian architecture, as well as common standards for semantic interoperability. (Kushniruk 2008)

2006 – Development of a comprehensive healthIT strategy for Canada in 2006 to guide the next 10 years of investment. (Infoway 2015)

The Blueprint v.2 in 2006 extended the original work, including an added privacy and security conceptual architecture and domain models for Public Health and Telehealth. The Blueprint also contains also more

details about the various deployment models in use or under consideration across Canada. (Infoway 2006).

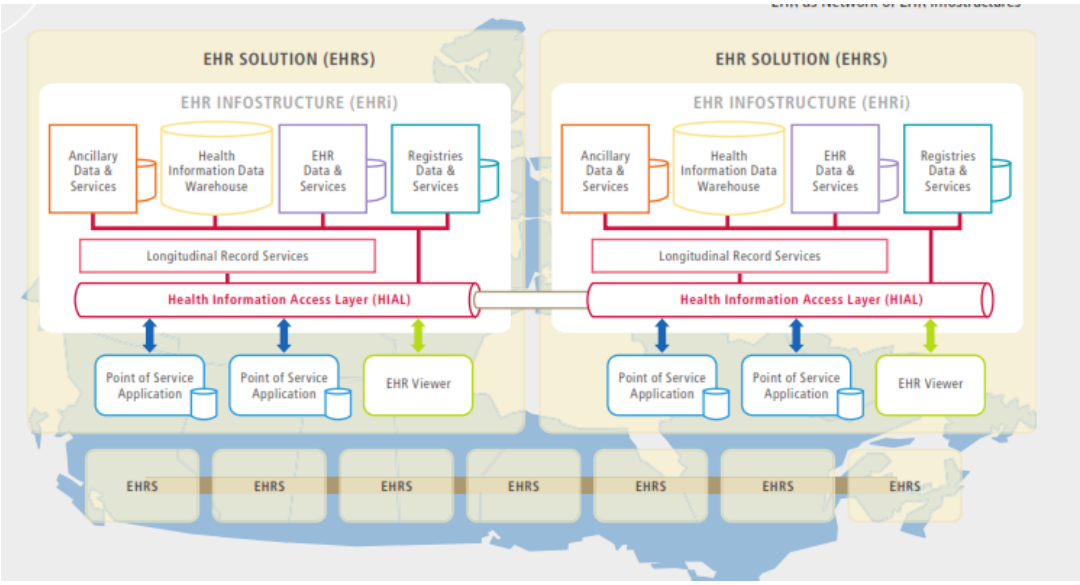
By March 2007 Infoway had approved over $1 billion, or 85 % of its total funding across all of its project areas. The implementation of the Infosystem was well underway across the country, but only three out of 13 jurisdictions was foreseen to have the full interoperable EHR Infostructure by the end of 2010.

In 2008 there were nine Infoway programs:

- Interoperable EHR
- Infostructure (Architecture, standards to ensure interoperability of systems and support reuse)
- Registries to provide electronic identification of patients and providers and provide basis of health records system
- Telehealth Diagnostic Imaging
- Drug information Systems
- Lab Information systems
- Telehealth
- Health surveillance
- Innovation/Adoption (Kushniruk 2008, 205)

Most jurisdictions had at least one element of the infostructure in place by end of 2010.

Canadian Infostructure

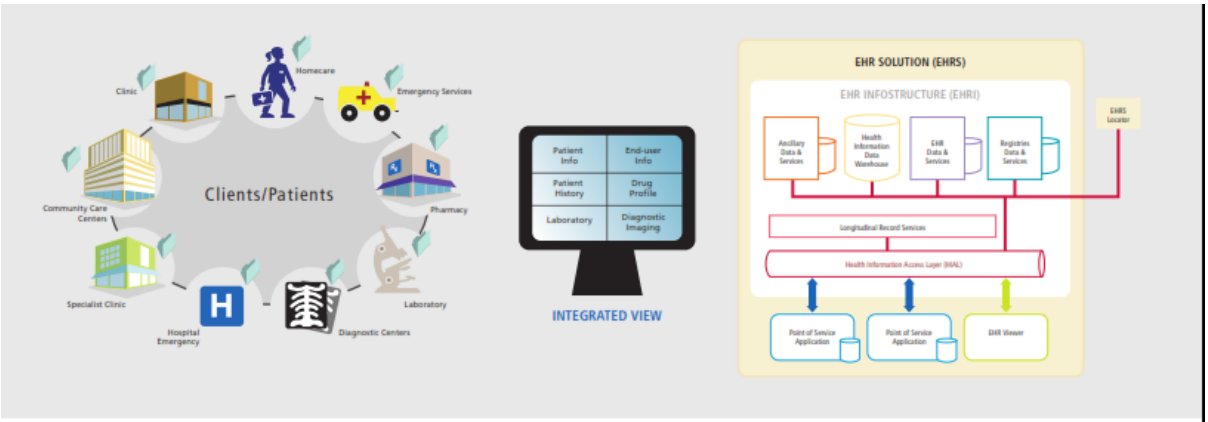


This model shows how sharing will be made possible while maintaining the rights and responsibilities for healthcare and standards among jurisdictions and professionals:

- Each jurisdiction will have its own EHRS, with some large jurisdictions having a number of regional EHR solutions that work together.
- The information systems that support information management and sharing are distributed across the jurisdictions.
- The characteristics of the clinical information databases are determined by national standards.
- All of the various databases and applications are connected to the EHRi so that information can flow wherever it is needed. At the same time, it flows through services that ensure that the information is managed securely and confidentially according to all current principles, standards and requirements.
- There is a federated set of EHR databases specific to pan-Canadian issues (i.e., Public Health Surveillance).
- There is a message-oriented model of communication.
- When full interoperability is achieved at the jurisdiction levels, using the principles of the EHRS Blueprint, the ability to find and access EHR data anywhere in the country will be a reality.

  (infoway 2006, 12)

Third version of the Blueprint came out in 2009. This included Privacy Security Architecture and Clinical Terminology Integration projects. The challenge was how to integrate the ca. 40000 existing health information systems in use across the country, while at the same time providing the opportunity for incorporating new and enhanced information systems and capabilities in support of the provision of care. (Infoway 2009)



EHRS BLUEPRINT BENEFITS

INTEGRATED VIEW
Each health service provider has an integrated view of relevant and timely clinical information for a client/patient, regardless of when, where, or how it was captured electronically.

SECURE AND APPROPRIATE SHARING
The Infostructure provides for secure transmission and storage of health information, uniformly supporting confidentiality requirements and providing for appropriate use.

EFFECTIVE, SCALABLE, ADAPTABLE
The Blueprint provides a cost effective method for integrating EHR applications, leveraging existing information systems while providing a scalable, extensible, and adaptive base for new and better EHR capabilities.

(Infoway 2009, Blueprint at a glance)

By 2015 Infoway has received $2.1 billion through five federal government grants since 2001. This has funded more than 400 projects nationwide By 2014-2015 more than 91 000 clinicians were using an HER.

Investments in EMRs, diagnostic imaging, drug information systems and telehealth have produced ca $13 billion benefits since 2007.

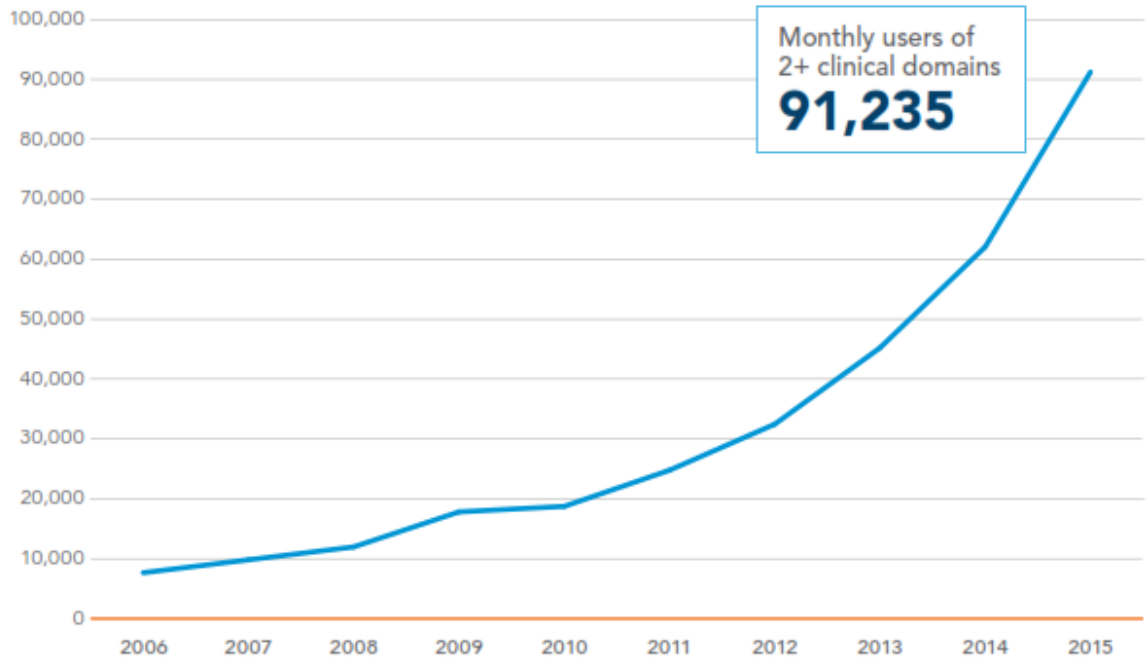
Infoway and the jurisdictions have focussed on constructing six core systems to collect information electronically:

- client and provider demographics,
- diagnostic images,
- profiles of dispensed drugs,
- laboratory test results,
- clinical reports or immunizations

This information constitutes the essence of an electronic health record (EHR) – the secure and lifetime record of a person's health and health care history – that's available to authorized health care providers and to the individual. (Infoway 2015, 8)

Infoway tracks each jurisdiction's progress on availability of data in each of the six core systems individually, then uses the average of these values to represent the jurisdiction's overall EHR availability. Based on these numbers, the pan-Canadian average EHR availability is 91 per cent as of March 31, 2015. (Infoway 2015p. 8)

FIGURE 4 Growth in Active Electronic Health Record Use



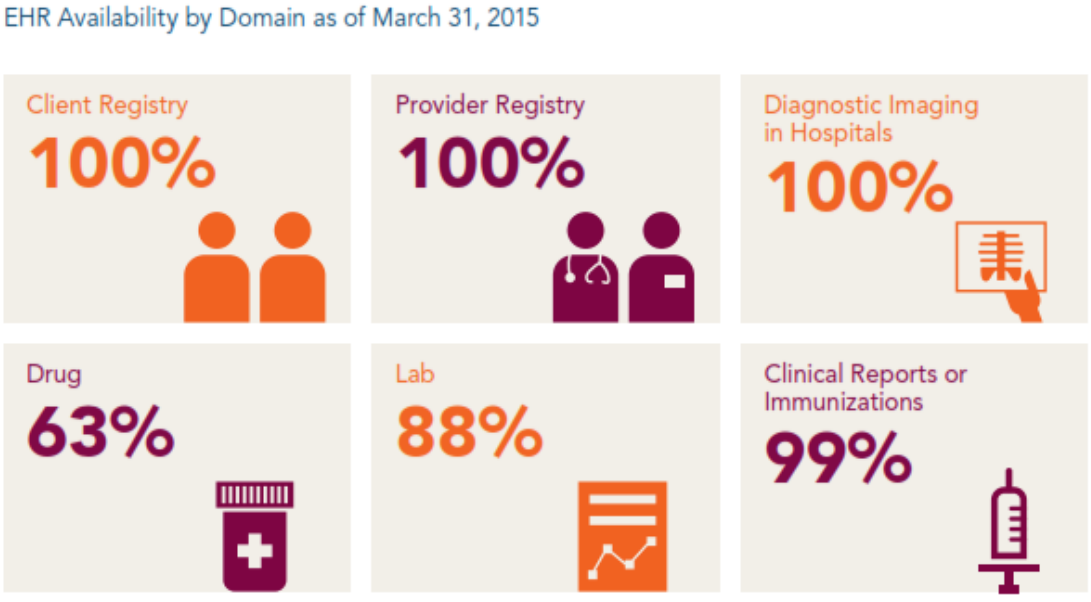
(Infoway 2015, 10)

FIGURE 7 Standards Conformance by Jurisdiction at March 31, 2015

	CLIENT REGISTRY	PROVIDER REGISTRY	DIAGNOSTIC IMAGING	DRUG INFORMATION SYSTEMS	LABORATORY INFORMATION SYSTEMS	CLINICAL REPORTS
BC						
AB						
SK						
MB						
ON						
QC						
NB	(+)			(+)		
NS						
PE						
NL						
YK						
NT						
NU			(+)			

Conformant · Partially conformant · Implementation in progress · Indicated commitment
Solution development predates pan-Canadian standards · Not applicable

Progress of Standards Conformance by Jurisdiction at March 31, 2015. (Infoway 2015)



(Infoway 2015, 15)

As of 31 March 2015, HER data was available for more than 91% of the Canadians. Five of the six areas of HER are nearly at 100%.

In implementing the EHR-system in Canada, Infoway has worked in collaboration with a Pan-Canadian Change Management Network (PCCM).

Change management is "…a strategic and systematic approach that supports people and their organizations in the successful transition and adoption of electronic health solutions. The outcomes of effective eHealth change management activities include solution adoption by users and the realization of benefits." *(Pan-Canadian Change Management Network, March 1, 2011)*

The PCCM created a national change management framework, based on six core elements:

1) Governance & Leadership
2) Stakeholder engagement
3) Workflow analysis & Integration
4) Communications
5) Training & Education
6) Monitoring & Evaluation

Infoway has a toolkit available for registered users for implementing an integrated change process.

The Top Eight List for Effective Change Plans

1. Process Mapping and Impact Analysis - includes analysis of expertise, structure, tools, clinical and administrative processes and culture

2. Stakeholders Identification and Readiness Assessment

    1. Readiness Assessment Tool

3. Training Needs Assessment – includes examples of training plans, and education end users as adult learners

    1. Training Approaches for Clinicians

4. Communication Planning

5. Project Governance and Change Management structure
6. Business Case for Change
7. Change implementation Success Factors
8. Adoption and Benefits Assessment and Knowledge contribution.

(Infoway 2012 – longer version on the slide deck)

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